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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,904	03/02/2004	Jason L. Mitchell	00100.02.0045	2636

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EXAMINER	
PAPPAS, PETER	

ART UNIT	PAPER NUMBER
2628	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,904	MITCHELL ET AL.	
	Examiner	Art Unit	
	PETER-ANTHONY PAPPAS	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

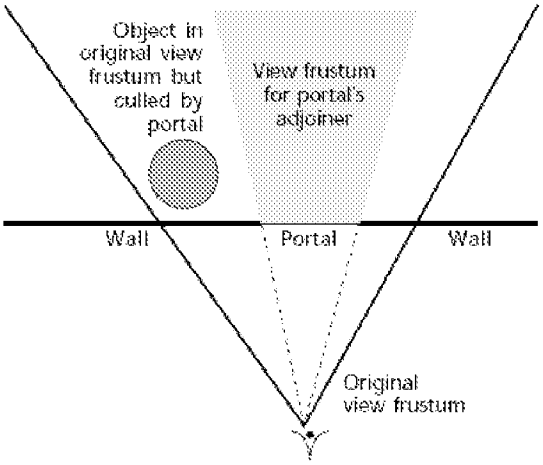
2. Claim 1-7 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1) in view of Bishop et al. (Designing a PC Game Engine).

3. In regard to claim 1 it is noted that said claim language discloses open-ended language (e.g., comprising) and as such said claim is not considered to be limited to only the limitations disclosed. Duluk, Jr. et al. teaches an apparatus and methods for rendering 3D graphic images preferably includes a port for receiving commands from a graphics application, an output for sending a rendered image to a display and a geometry-operations pipeline, coupled to the port and to the output, the geometry-operations pipeline including a block for performing transformations (Abstract).

Duluk, Jr. et al. teaches that the command-fetch-and-decode block 841 handles communication with the host computer through the graphics port. It converts its input into a series of packets, which it passes to the geometry block 842. Most of the input stream (packets) consists of geometrical data, that is to say, vertices that describe lines, points and polygons (col. 6, ll. 23-28). The geometry block 842 transforms incoming graphics primitives into a uniform coordinate space ("world space"). It then clips the

primitives to the (bounding volume object) viewing volume ("frustum"). In addition to the six planes that define the viewing volume (left, right, top, bottom, front and back), the subsystem provides six user-definable clipping planes (col. 6, ll. 38-43). Duluk, Jr. et al. further teaches that the trivial reject/accept test for both the user defined and the view volume clip planes are performed on each vertex (col. 13, ll. 35, 36).

It is noted that the view volume (bounding volume object) illustrated in Fig. 1 is considered to read on a geometric representation of a specific object as said view volume is itself a 3D geometric object who geometry dictates visibility (e.g., objects outside the bounds of said view volume are culled – aka view-frustum culling). It is noted that Fig. 1 also illustrates a triangulated object for display located within said view volume (e.g., said triangulated object is identified as geometry whose visibility status is desired). However, Duluk, Jr. et al. fails to explicitly teach wherein said bounding volume object (e.g., view frustum) is a geometric representation of a specific object identified as geometry whose visibility status is desired (e.g., a window or doorway – Specification, ¶ 11). Bishop et al. teaches a bounding volume object (e.g., view frustum) which is a geometric representation, at least in part, of a specific object (e.g., portal/window) identified as geometry whose visibility status is desired (p. 50, Fig. 5). It is noted that said illustrated portal, which is located on a wall, is considered to be visible.



It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Bishop et al. into the system taught by Duluk, Jr. et al., because through such incorporation it would provide a means of reducing the amount of processing necessary for determining visible objects within a given scene by modifying the size of the view frustum so to not include objects which cannot be seen (e.g., are behind a wall) and thus would result in a system with increased efficiency. For example, the wider view frustum may include objects which are not visible due to said wall, assuming said wall is not invisible, and thus it would improve efficiency by limiting said view frustum to said portal which is able to be seen through.

Duluk, Jr. et al. teaches that there are four types of packets output from the geometry block 842: color vertex, spatial vertex, propagated mode, and propagated vertex (col. 17, ll. 7-10). A Color Vertex packet contains the properties associated with a vertex's position. Every vertex not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a single vertex color packet. A Spatial Vertex packet contains the spatial coordinates

(indices) and relationships of a single vertex. Every input vertex packet not removed by back face culling or clipped off by volume clip planes (trivial reject or multiply planes exclude complete polygon) produces a spatial vertex packet corresponding to the exact input vertex coordinates (col. 17, ll. 14-29). It is noted that the creation of packetized vertex information (e.g., color vertex packets, spatial vertex packets and/or propagated vertex packets) from said series of packets passed to geometry block 842 is considered to read on draw packets with a set visibility query identifier as the creation of said packetized vertex information is an indication that a given packet from said series of packets passed to geometry block 842 was not culled or clipped (e.g., discarded). Duluk, Jr. et al. teaches rendering information stored within said set visibility query identifier packets to a display once said information is further processed by the pipeline illustrated in Fig. 3.

4. In regard to claim 2 it is noted that the respective claim language fails to disclose what constitutes a command processor and therefore geometry block 842 in combination with mode-extraction block 843 are considered to read on elements of a command processor. Duluk Jr., et al. teaches prior to rendering the draw packets providing the draw packets to a mode-extraction block 843 such that the command processor checks for the set visibility query identifier ("…The mode-extraction block 843 separates the data stream into two parts: vertices and everything else..." – col. 6, ll. 51-55).

5. In regard to claim 3 it is noted that respective claim language fails to disclose what exactly constitutes an index for a packet. Thus, a packet index is considered to

read on any identifier (e.g., a memory address, packet size, location of the packet within a transmission sequence of a plurality of packets, etc.) that is conventionally used to identify a respective packet within an electrical system. It is noted that anytime a packet is processed (e.g., transmitted or received for further processing) a respective packet index is considered to either be created or fetched as without the use of some index to identify said packet said packet and the respective information contained within said packet would be unable to be utilized in any fashion within said system. The rationale disclosed in the rejection of claim 1 is incorporated herein (col. 17, ll. 14-29).

6. In regard to claim 4 the rationale disclosed in the rejection of claim 1 is incorporated herein ("…geometry block 842…then clips the primitives to the viewing volume…" – col. 6, ll. 38-43; "…There are four types of packets output from the geometry block 842: color vertex, spatial vertex..." – col. 17, ll. 7-10). As previously disclosed said spatial vertex packet contains the spatial coordinates and relationships of a single vertex (col. 17, ll. 14-29). It is noted that said spatial coordinates and said spatial relationships would not be available if a given spatial vertex packet, which is indicated as containing data relevant to visibility by virtue of the fact that is was generated and not culled or clipped, was not output by geometry block 842.

7. In regard to claim 5 Duluk, Jr. et al. teaches that a duration counter tracks the time a vertex is in the stage 212 of the transformation unit (col. 20, ll. 37, 38; Fig. 4). Said transformation unit is part of geometry block 842 (Fig. 2) and geometry block 842 is located before mode-extraction block 843. Stage A 212 could require more than one pipeline cycle to process the packet, depending on the type of packet it is and the state

that is set in the stage. If more than one pipeline cycle is required, the stage raises the Pipeline_Full signal. If Pipeline_Full is raised, the unit controller is not allowed to advance the next packet down the pipe. When the stage detects that the packet will complete in the current stage, the Pipeline_Full signal is cleared, and just as the unit controller advanced the command register of stage A, stage A advances the command register of stage B (col. 18, ll. 43-52).

8. In regard to claim 6 (specifically view frustum comparison) the rationale disclosed in the rejection of claim 1 is incorporated herein (col. 6, ll. 38-43; col. 13, ll. 35, 36).

9. In regard to claim 7 the rationale disclosed in the rejections of claims 1-4 are incorporated herein.

10. In regard to claim 9 the rationale disclosed in the rejection of claim 5 is incorporated herein.

11. In regard to claim 10 the rationale disclosed in the rejection of claim 6 is incorporated herein.

12. In regard to claim 11 Duluk, Jr. et al. illustrates in Fig. 8 that said apparatus includes CPU 810 (general processing unit) and memory 820 (memory device) for storing CPU-executable instructions (software 821). The rationale disclosed in the rejection of claim 1 is incorporated herein.

13. In regard to claim 12 the rationale disclosed in the rejection of claim 2 is incorporated herein.

14. In regard to claim 13 the rationale disclosed in the rejection of claim 3 is incorporated herein.

15. In regard to claim 14 the rationale disclosed in the rejection of claim 4 is incorporated herein.

16. In regard to claim 15 the rationale disclosed in the rejection of claim 5 is incorporated herein.

17. In regard to claim 16 the rationale disclosed in the rejection of claim 6 is incorporated herein.

18. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duluk, Jr. et al. (U.S. Patent No. 6, 577, 317 B1) and Bishop et al. (Designing a PC Game Engine), as applied to claims 1-7 and 9-16, in view of Migdal et al. (U.S. Patent No. 5, 886, 702).

19. In regard to claim 17 the rationale disclosed in the rejection of claim 1 is incorporated herein. However, Duluk, Jr. et al. and Bishop et al. fail to explicitly teach wherein the geometric representation of the specific object is a low resolution model of the specific object that is rendered prior to a detailed model of the specific object. Migdal et al. teaches a system and method for dynamic resolution capabilities in the level of detail for creating meshes (col. 4, ll. 54-67; col. 5, ll. 1-12), wherein a geometric representation (e.g., mesh) of a specific object (e.g., face) is a low resolution model of the specific object that is rendered prior to a detailed model of the specific object being rendered (col. 7, ll. 65-67; col. 8, ll. 1-13; Figs. 2B-2F).

It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Migdal et al. into the system taught by Duluk, Jr. et al. and Bishop et al., which is directed toward geometry operations in a 3D

graphics pipeline (col. 1, ll. 63-67), because through such incorporation it would provide greater flexibility over the geometry processed by said system by allowing, for example, an operator of system to specify geometry of greater or lower detail depending upon the requirements that need to be met at a given point in time while still allowing said geometry to later be altered (e.g., by having its resolution increased or decreased). The addition of this flexibility would result in a more optimized and efficient system then if said flexibility was not present.

20. In regard to claim 18 the rationale disclosed in the rejection of claims 2 and 4 are incorporated herein.

21. In regard to claim 19 the rationale disclosed in the rejection of claim 5 is incorporated herein.

Response to Arguments

22. In response to Applicant's remarks that the term "is" is inherently synonymous with the term "comprises" the Examiner does not agree that said terms are synonymous. The language "wherein the bounding volume object comprises a geometric representation" does not require anything more than said geometric representation to be included within said bounding volume object whereas the language "wherein the bounding volume object is a geometric representation" requires that said bounding volume object and said geometric representation are the same.

23. In response to Applicant's remarks the Examiner has ignored the claim term "object" in "bounding volume object" it is noted that the Examiner disclosed in the prior Office Action: "It then clips the primitives to the (bounding volume object) viewing

volume ('frustum') … It is noted that the view volume (bounding volume object) illustrated in Fig. 1 includes a triangulated object (geometric representation of a specific object) for display (said triangulated object is identified as geometry whose visibility status is desired)." (p. 3, ¶ 2). In the instant Office Action the Examiner discloses: "It then clips the primitives to the (bounding volume object) viewing volume ('frustum') ... It is noted that the view volume (bounding volume object) illustrated in Fig. 1 is considered to read on a geometric representation of a specific object as said view volume is itself a 3D geometric object who geometry dictates visibility (e.g., objects outside the bounds of said view volume are culled – aka view-frustum culling)." It is the position of the Examiner that it is clear, in light of both the prior and instant Office Actions, that the respective cited prior art meets the limitations of a "bounding volume object" and that the interpretation of the Examiner has been conveyed to the Applicant.

24. Applicant's remarks with respect to the amended claim language, specifically in light of Applicant's amendments of the respective claim language in which the term "comprises" has been replaced with "is," have been considered but are moot in view of the new ground(s) of rejection.

25. Applicant's remarks have been fully considered but they are not persuasive.

Conclusion

26. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure: Menon et al. (U.S. Patent No. 5, 926, 182) and Menon et al. (5, 926, 183).

27. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER-ANTHONY PAPPAS whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ulka Chauhan/
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